VoiceOver and Making Carbon Applications Accessible

Session 108

These are confidential sessions—please refrain from filming or taking pictures.

Application Technologies

VoiceOver

Patti Yeh
Software Engineer, VoiceOver Team

http://developer.apple.com/wwdc2005/

What Is VoiceOver?

- Screen reader software for Mac OS X
- Speaks screen activity and desktop orientation
- Provides keyboard access to everything

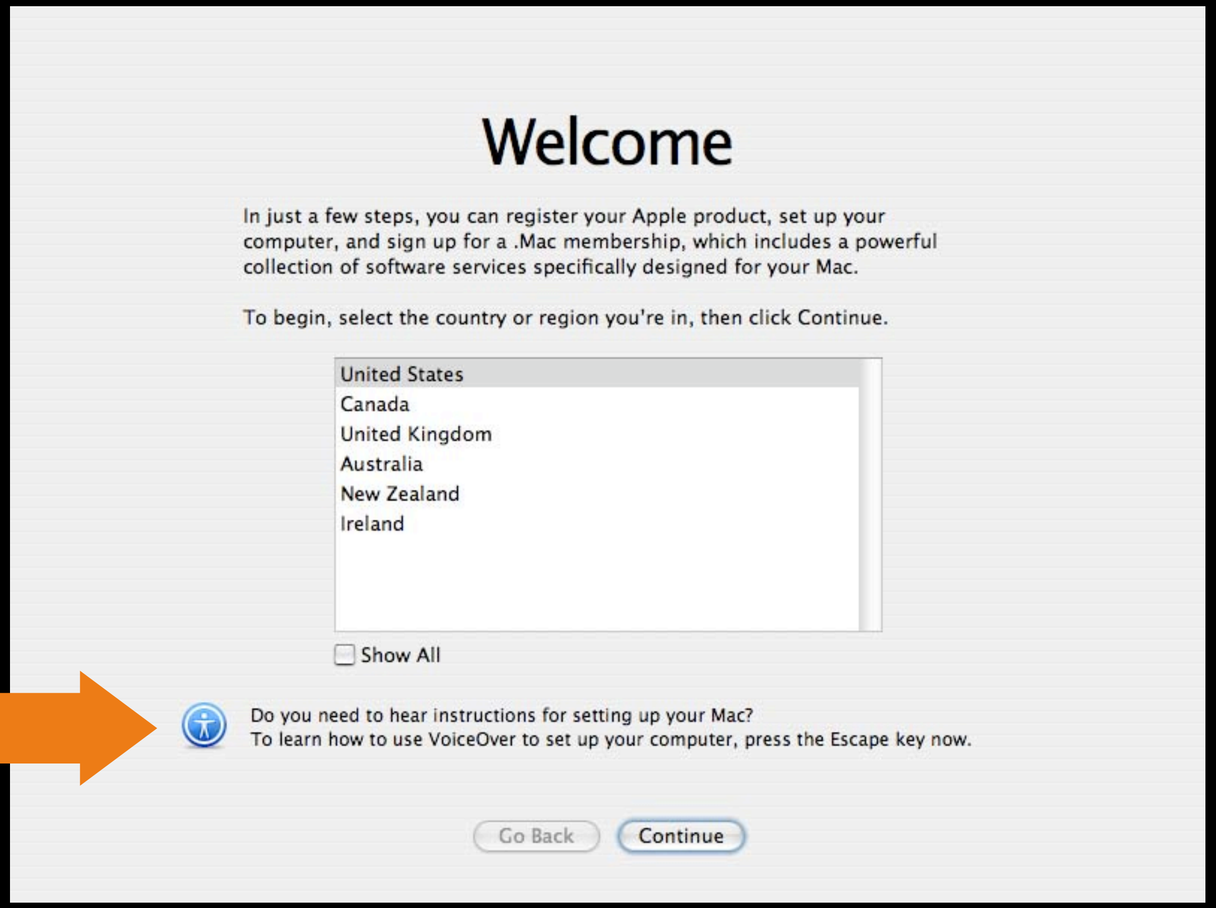
Session Overview

- VoiceOver
- Importance of accessibility
- Demo of VoiceOver
- Accessorizing your application

Built-in, Not Bolted-on!

Available During Installation

Setup Assistant Tutorial



Available During User Log In

Available Throughout Mac OS X

Many Tiger Apps Already Accessible

Available Everywhere!

Who Will Benefit?

- Users who are blind, visually impaired, or learning disabled
- Anyone who collaborates with the visually impaired
- Aging population

You!

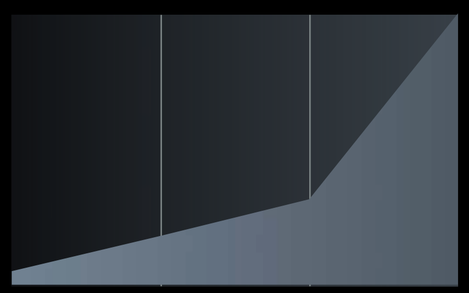
Education

Government

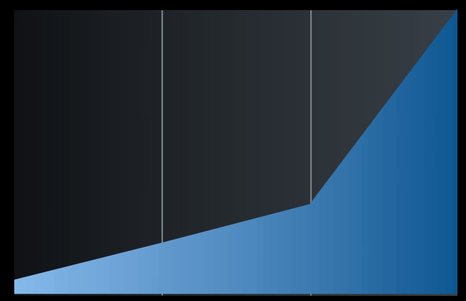
Enterprise

Section 508

Accessible applications



Your market share



Apple’s market share

Demo

VoiceOver

http://developer.apple.com/wwdc2005/

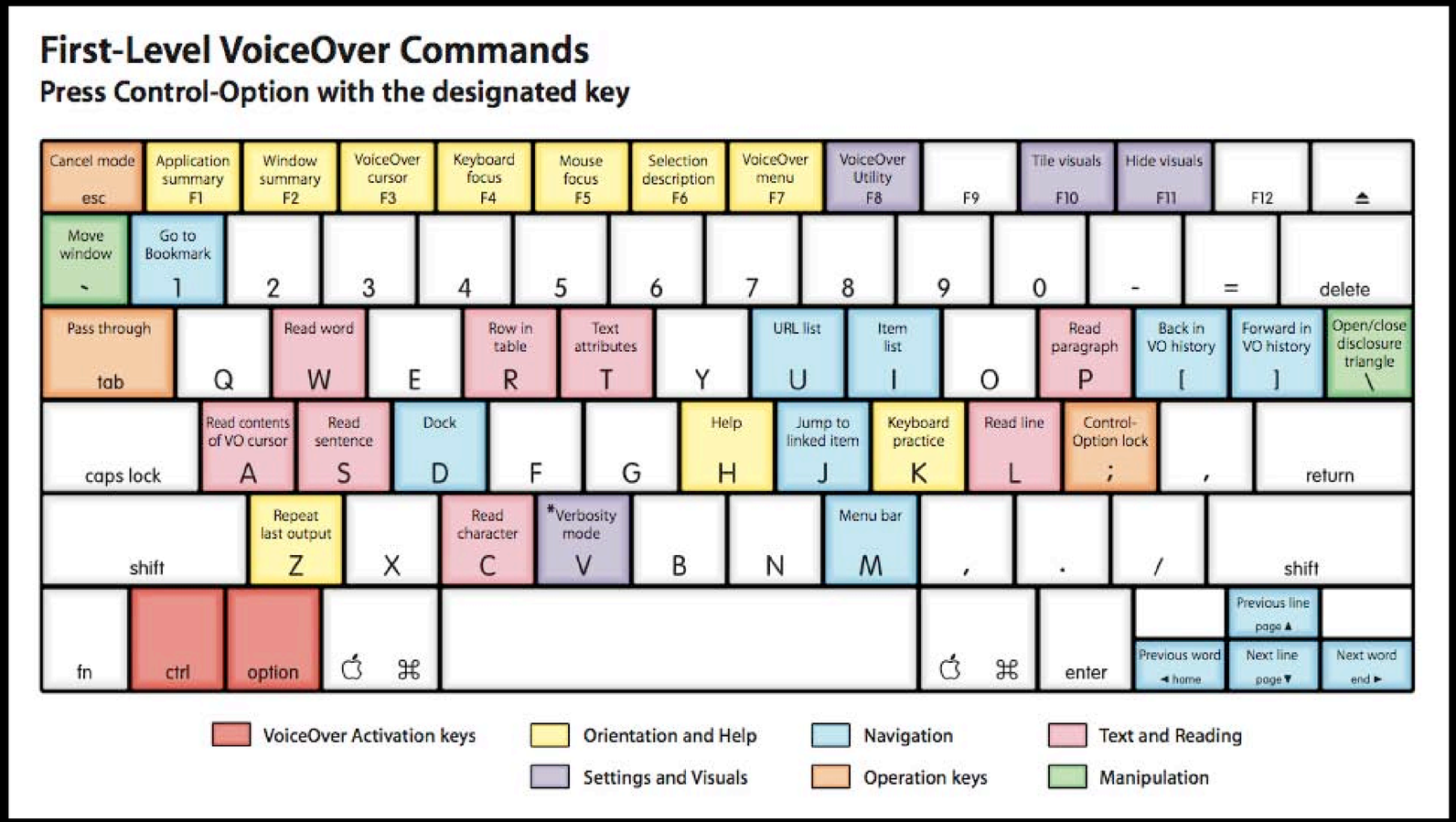
What Should I Do Now?

- Support Accessibility APIs
- Hook up full keyboard navigation
- Provide keyboard alternatives to mouse operations
- Tools to help:

Accessibility Verifier

Accessibility Inspector

Test with VoiceOver



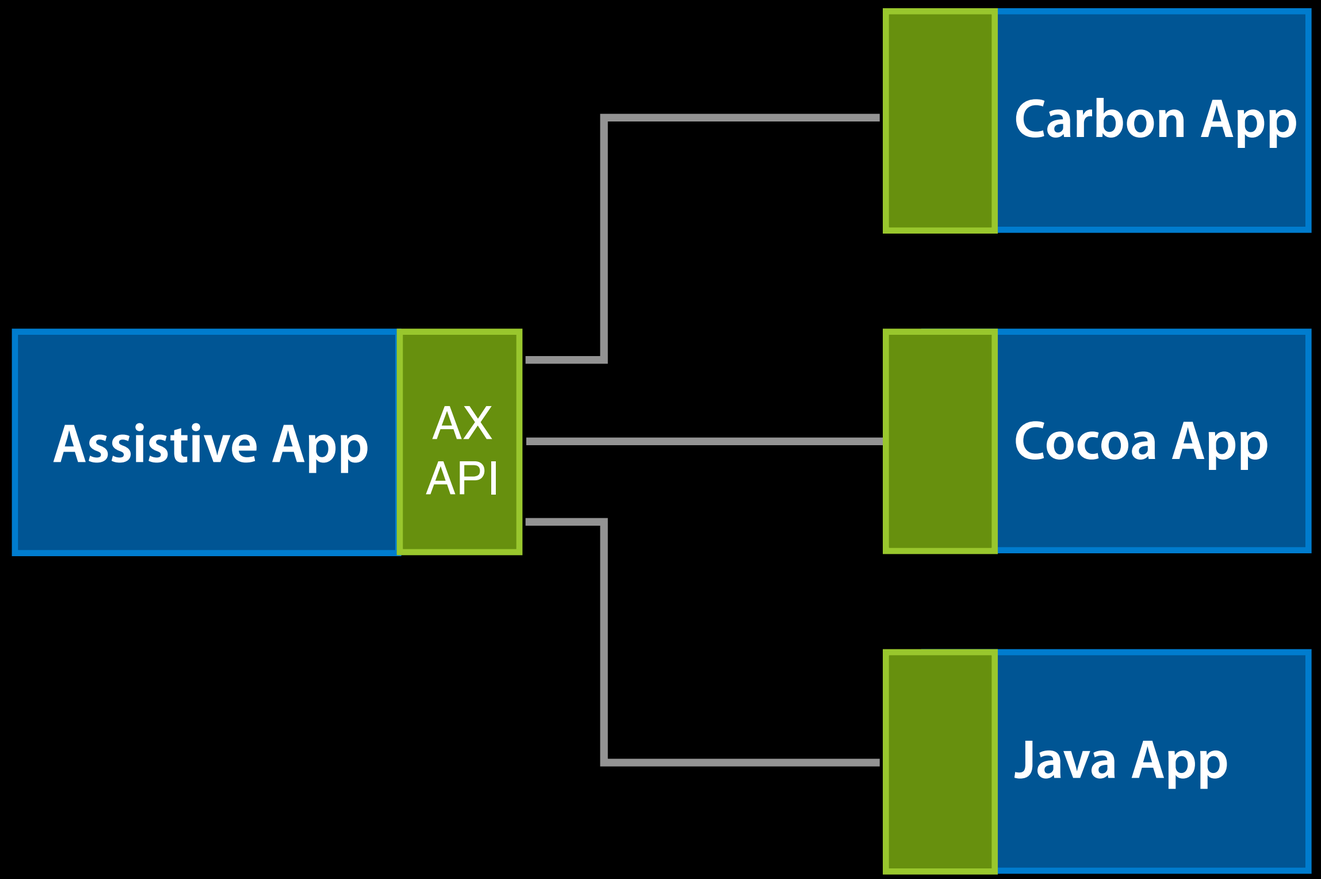
http://www.apple.com/accessibility/voiceover/

Accessibility Architecture

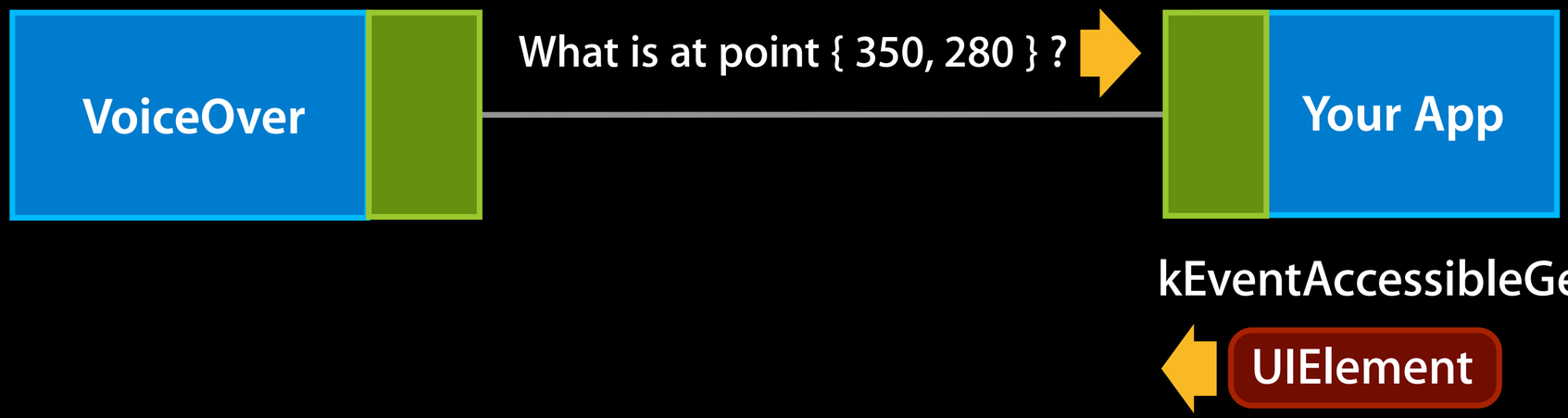
Guy Fullerton
Engineering Manager, HIToolbox Team

http://developer.apple.com/wwdc2005/

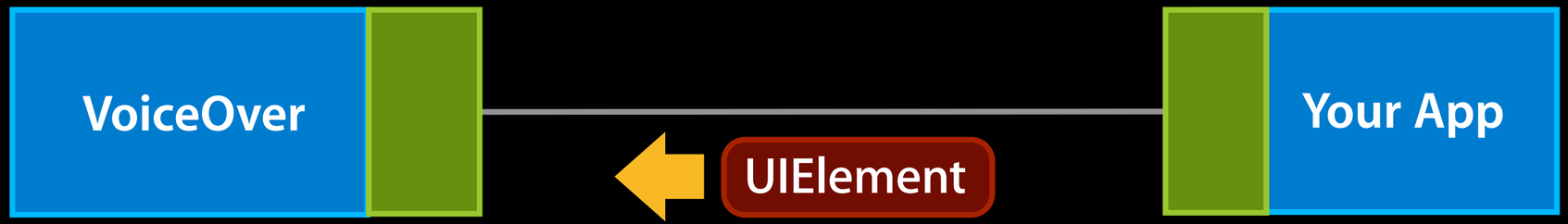
Accessibility Architecture



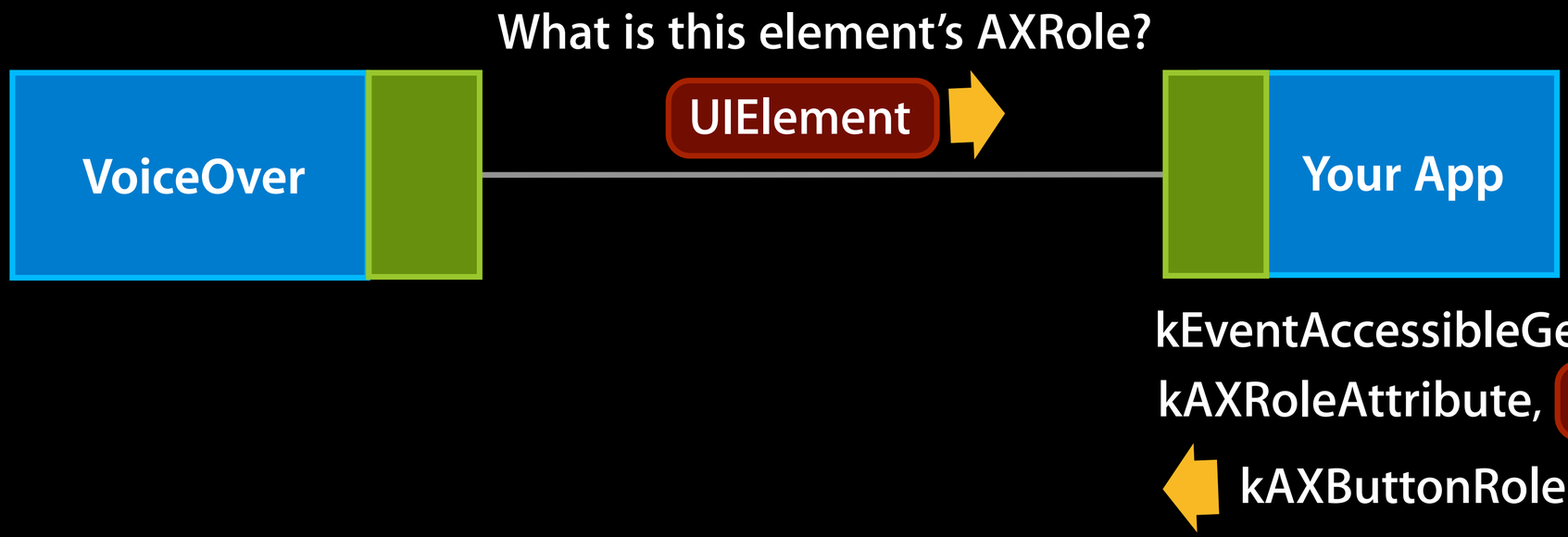
Accessibility Architecture



Accessibility Architecture



Accessibility Architecture



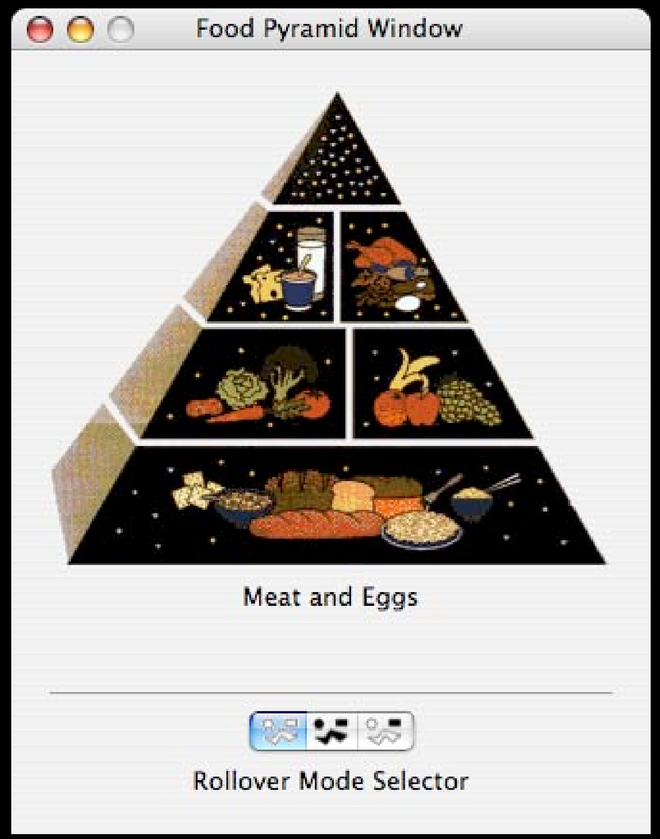
Accessibility Architecture

Accessibility Architecture

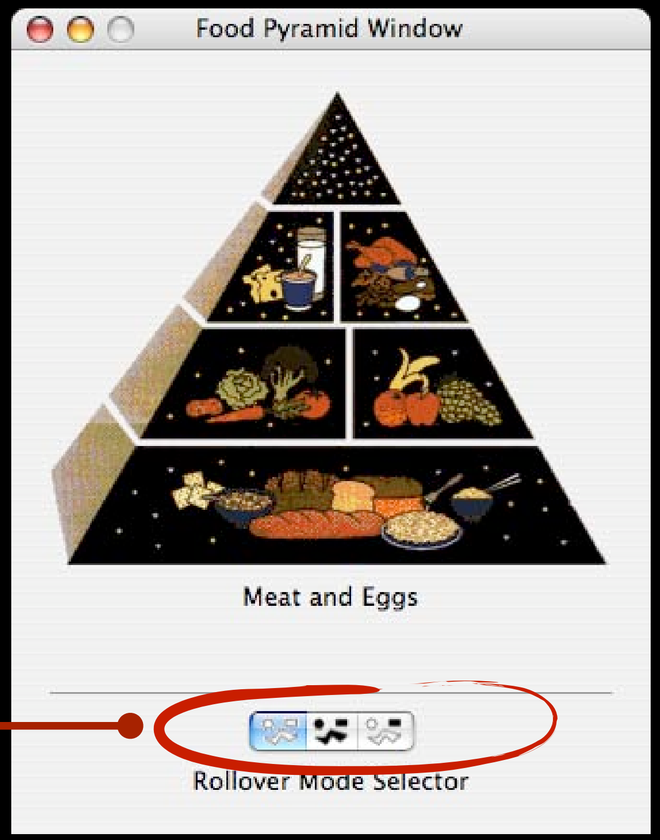
kEventAccessiblePerformNamedAction
kAXPressAction, UIElement

HIViewSimulateClick

Accessibility Architecture

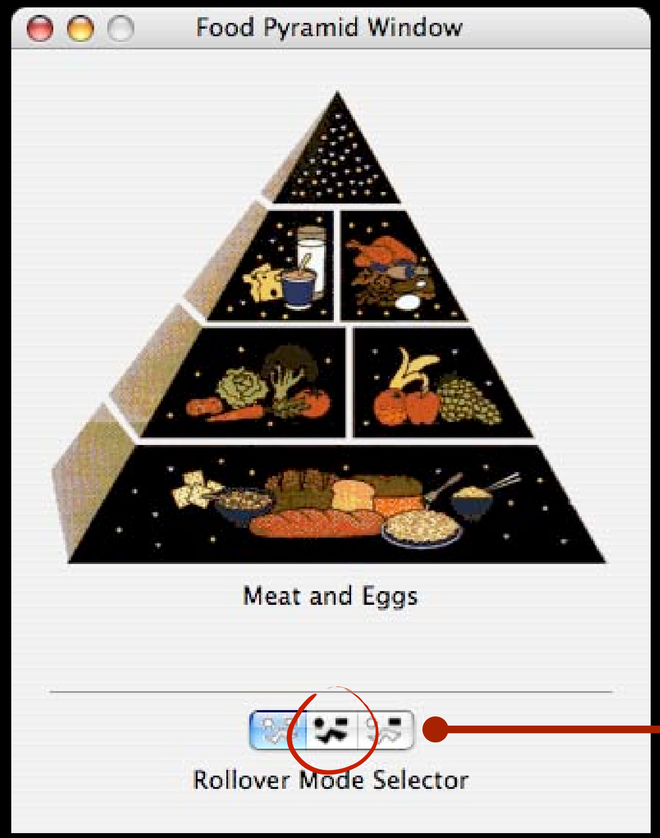


Accessibility Architecture



UIElement:
Segmented View

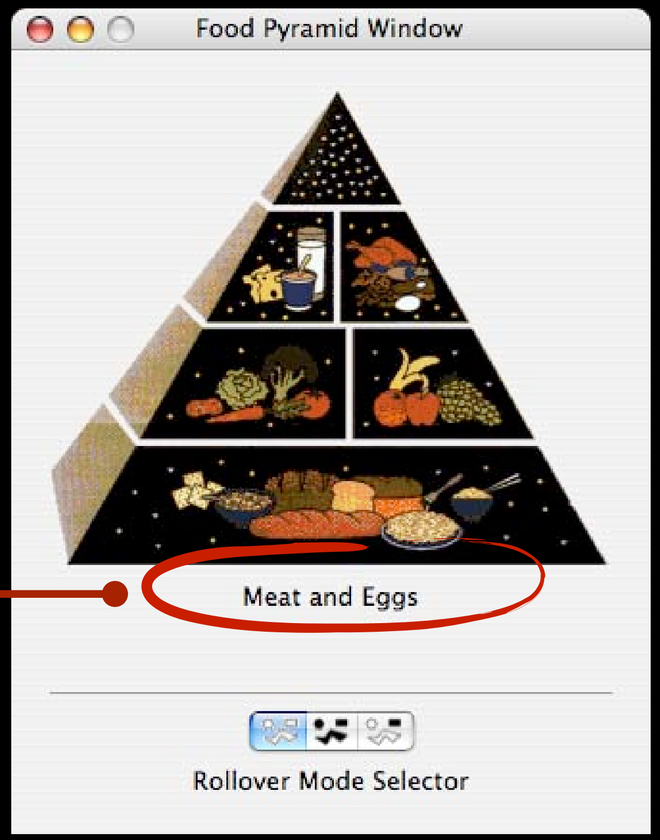
Accessibility Architecture



UIElement:
Segmented View

UIElement:
Segment 2
of Segmented
View

Accessibility Architecture



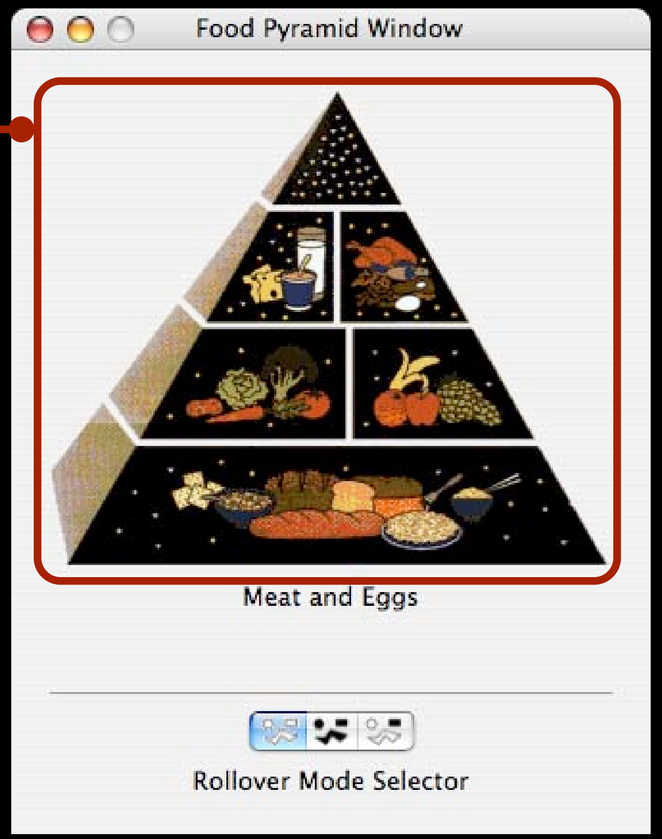
UIElement:
Meat and Eggs
Static Text

UIElement:
Segmented View

UIElement:
Segment 2
of Segmented
View

Accessibility Architecture

UIElement:
Food Pyramid
Group



UIElement:
Meat and Eggs
Static Text

UIElement:
Segmented View

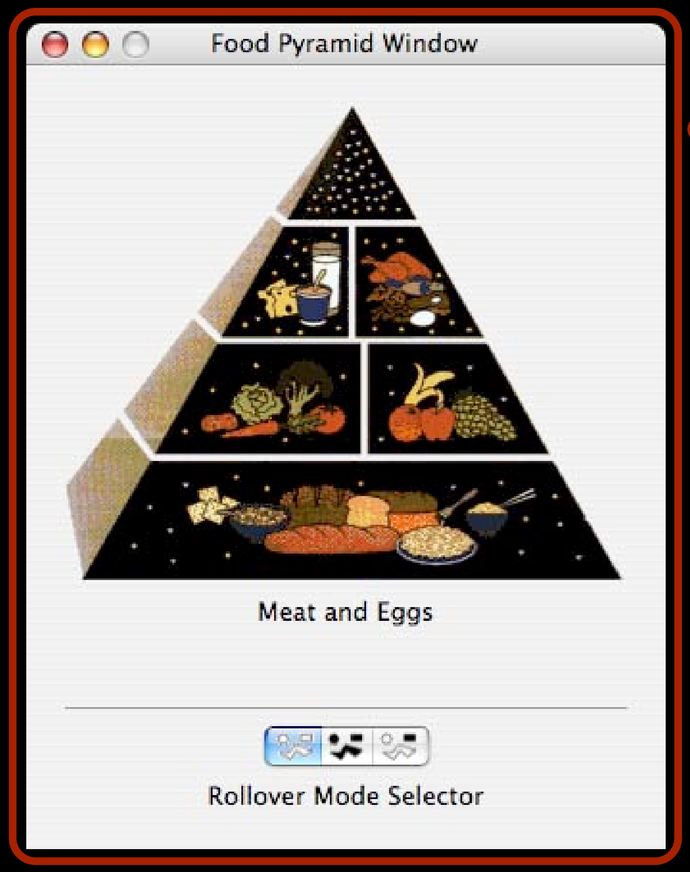
UIElement:
Segment 2
of Segmented
View

Accessibility Architecture

UIElement:
Food Pyramid
Group

UIElement:
Meat and Eggs
Static Text

UIElement:
Segmented View



UIElement: Food
Pyramid Window

UIElement:
Segment 2
of Segmented
View

Accessibility Architecture

Carbon UIElements

UIElement:

Accessibility Architecture

Carbon UIElements

UIElement:
- HIObjectRef
- Identifier

Accessibility Architecture

Carbon UIElements

UIElement:

HIObjectRef: HIViewRef, WindowRef, MenuRef, etc.

Identifier

Accessibility Architecture

Carbon UIElements

UIElement:

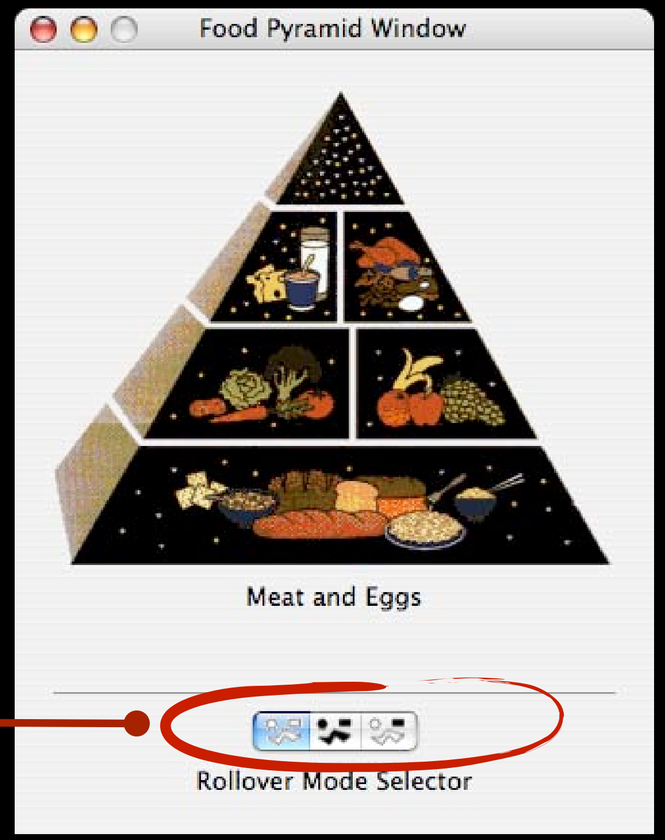
HIObjectRef: HIViewRef, WindowRef, MenuRef, etc.

Identifier: 64-bit space defined by the HIObject

Accessibility Architecture

Carbon UIElements

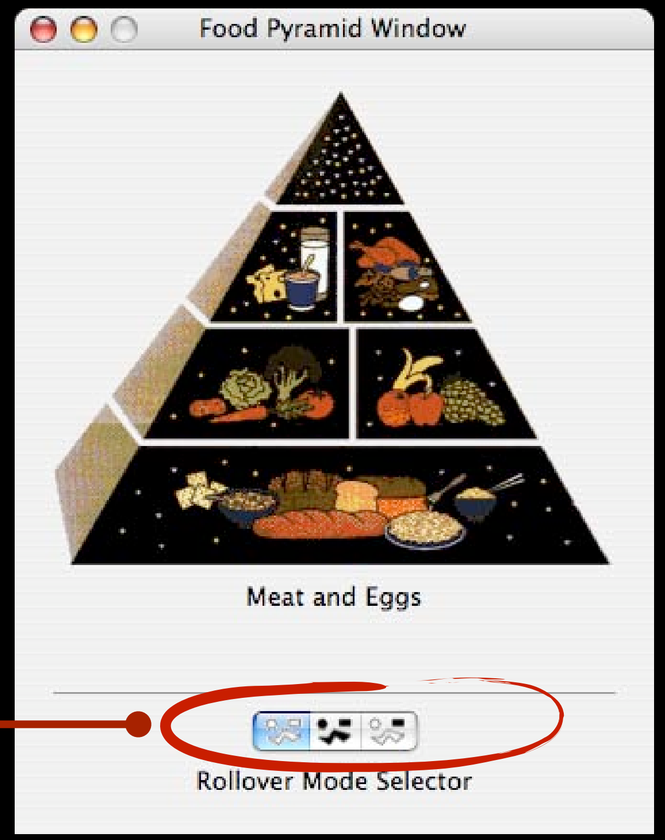
UIElement: Segmented View
    HIObjectRef: 0x04257602 (segmented view HIViewRef)



Accessibility Architecture

Carbon UIElements

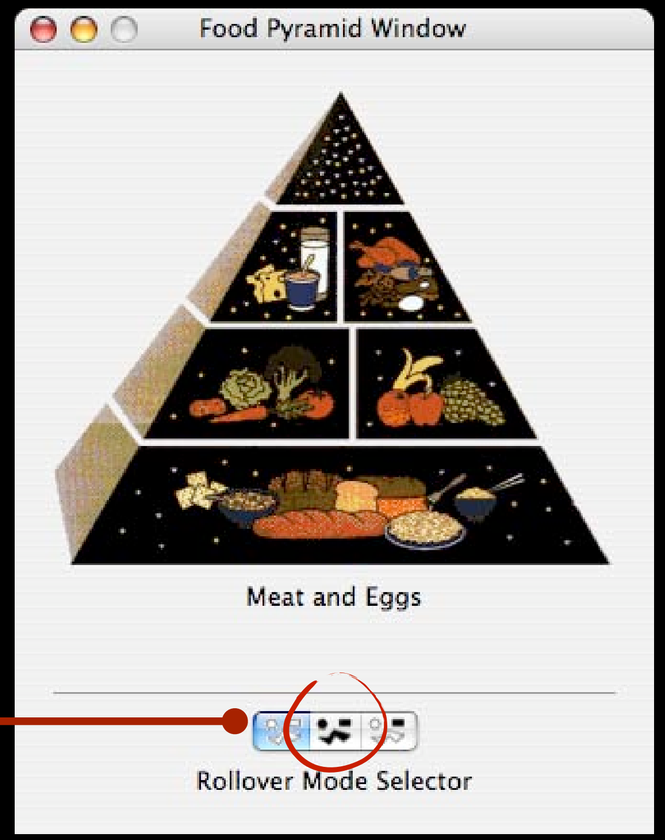
UIElement: Segmented View
HIObjectRef: 0x04257602 (segmented view HIViewRef)
Identifier: 0 (the whole segmented view)



Accessibility Architecture

Carbon UIElements

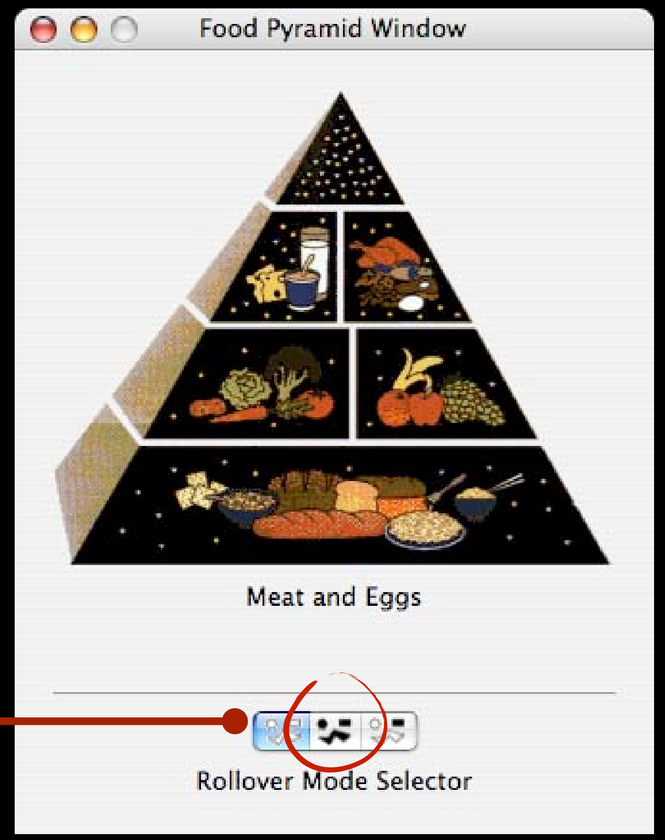
UIElement: Segment 2 of Segmented View



Accessibility Architecture

Carbon UIElements

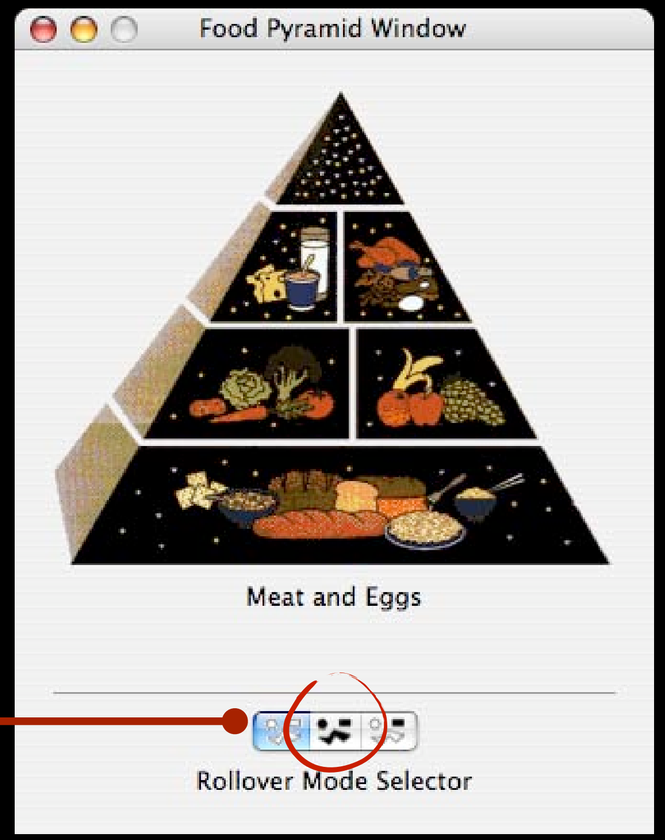
UIElement: Segment 2 of Segmented View
HIObjectRef: 0x04257602 (segmented view HIViewRef)



Accessibility Architecture

Carbon UIElements

UIElement: Segment 2 of Segmented View
HIObjectRef: 0x04257602 (segmented view HIViewRef)
Identifier: 2 (segment 2)



Managing Elements

- Creation
  - AXUIElementCreateWithHIObjectAndIdentifier
- Destruction
  - CFRelease
- Introspection
  - AXUIElementGetHIObject
  - AXUIElementGetIdentifier

Making your Carbon App Accessible

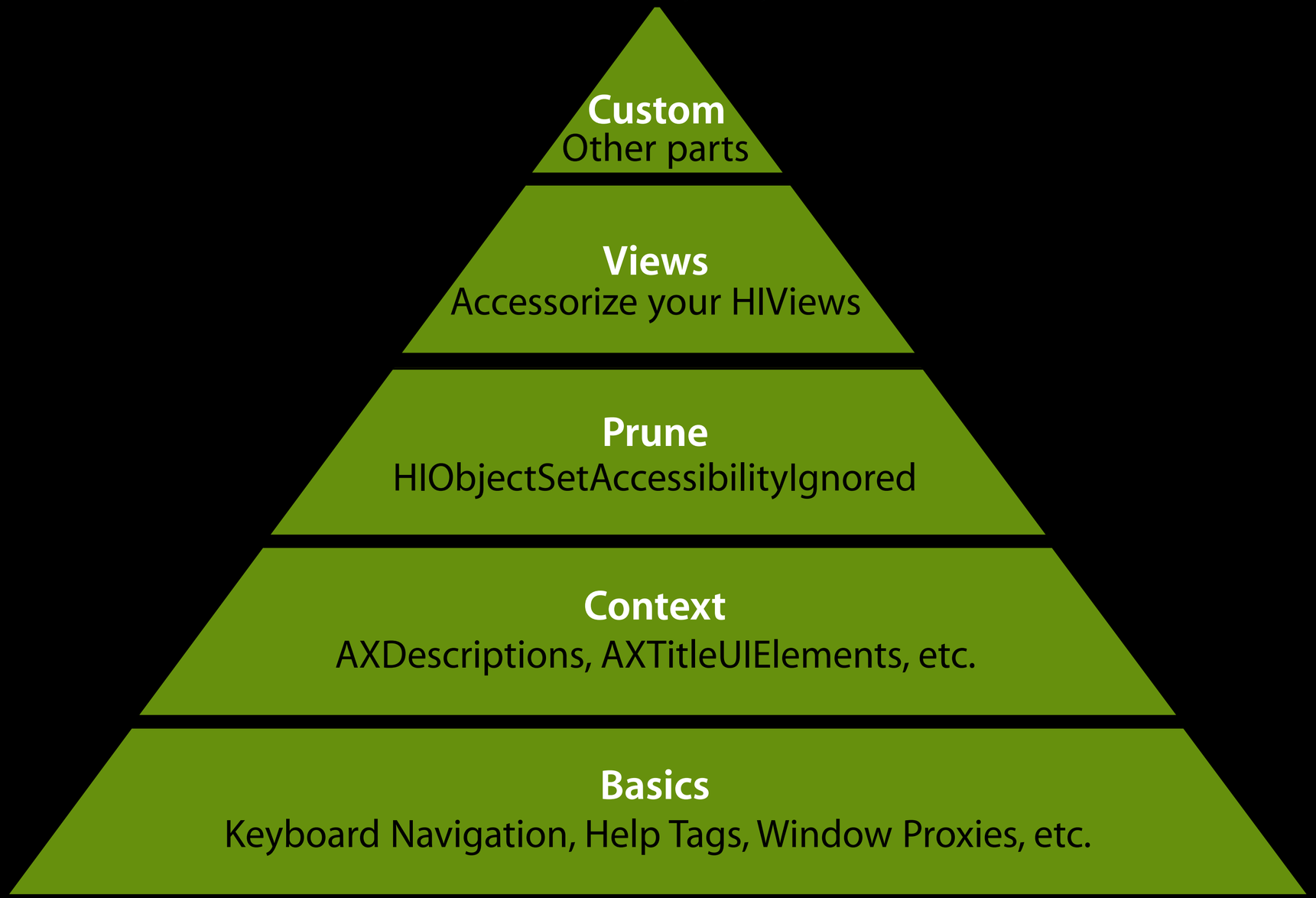
http://developer.apple.com/wwdc2005/

How Much Effort?

Accessibility Pyramid

How Much Effort?

Accessibility Pyramid



Implement the Basics

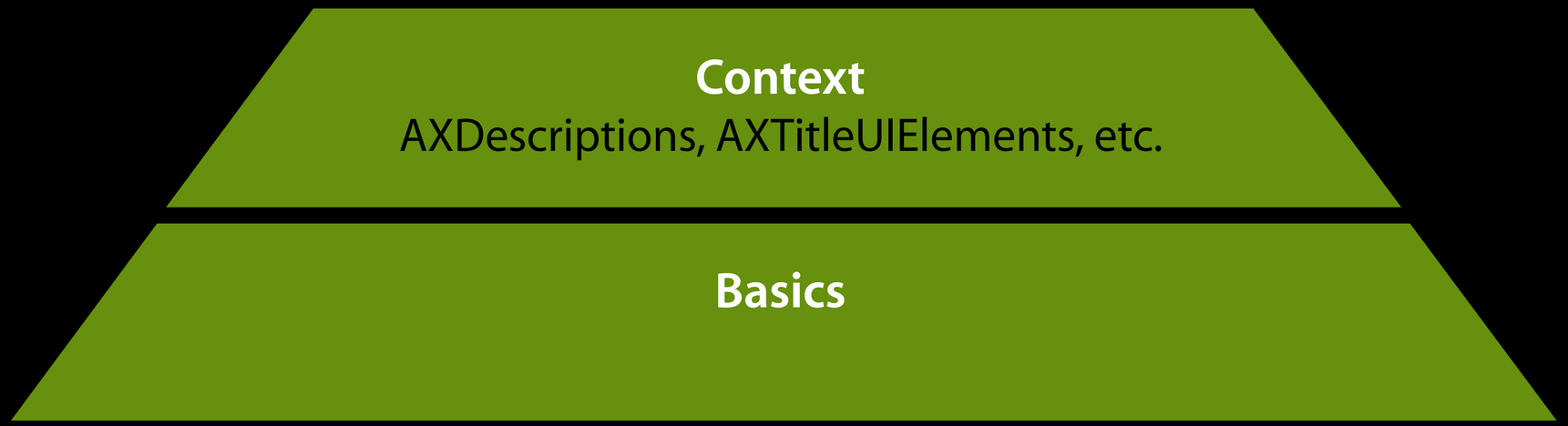
Basics

Keyboard Navigation, Help Tags, Window Proxies, etc.

Basics

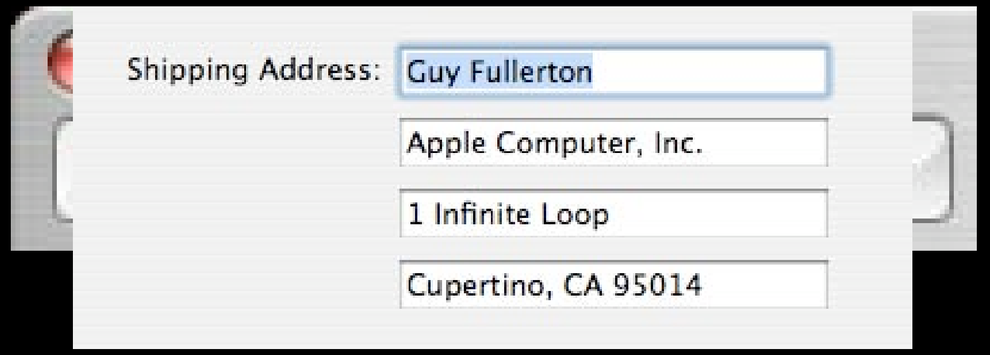
- Implement Keyboard Navigation for your views
- Provide Window Proxies
  - HIWindowSetProxyFSRef, etc.
  - Automatic support for AXDocument attribute
- Provide Help Tags
  - Automatic support for AXHelp attribute

Provide Context



Provide Context

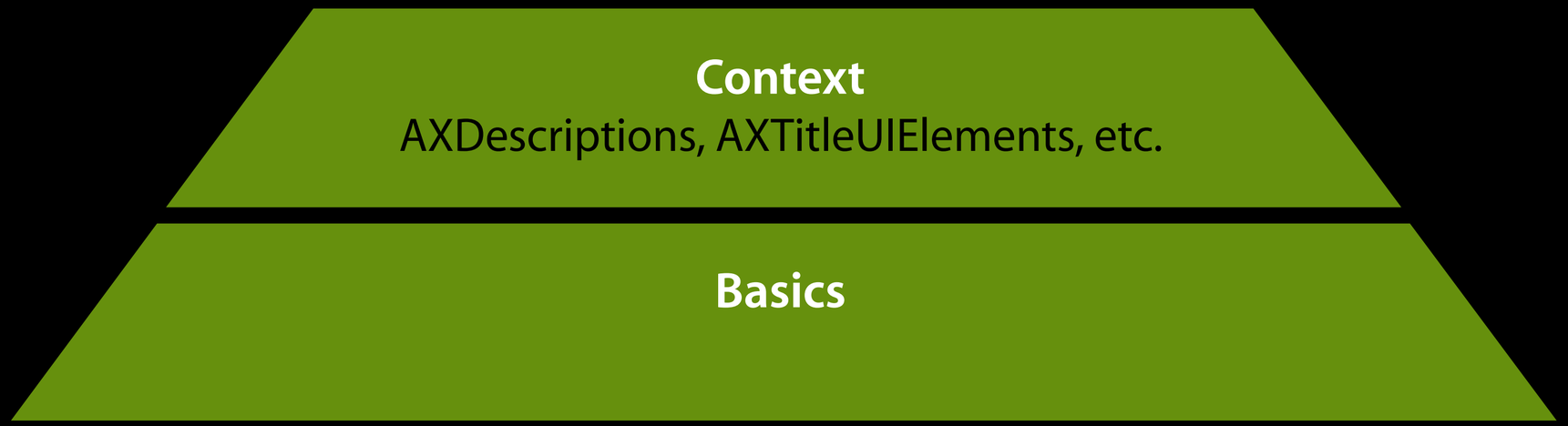
- “Auxiliary Attributes”
- HIObjectSetAuxiliaryAccessibilityAttribute
- Attributes whose values are constant
  - AXDescriptions, AXTitleUIElements, etc.
- Look for elements without titles



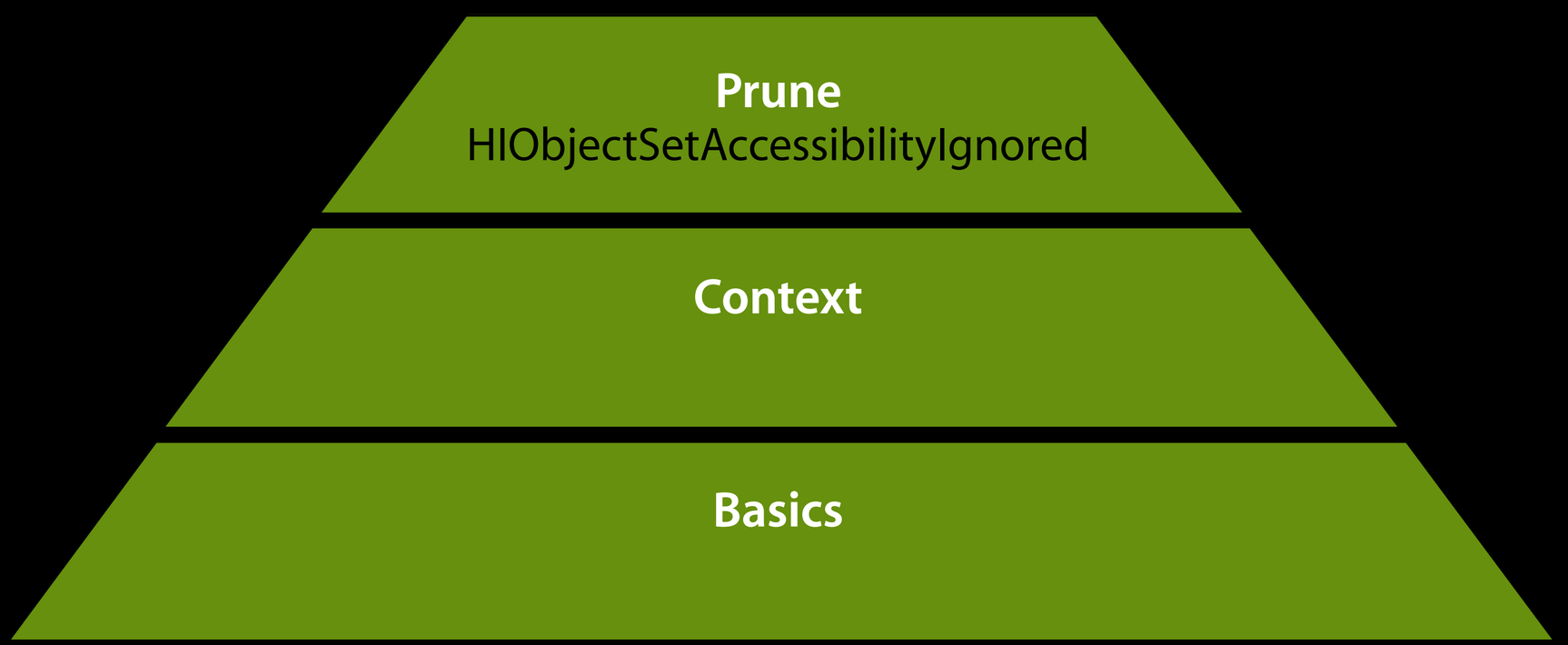
Demo

Adding Auxiliary Attributes

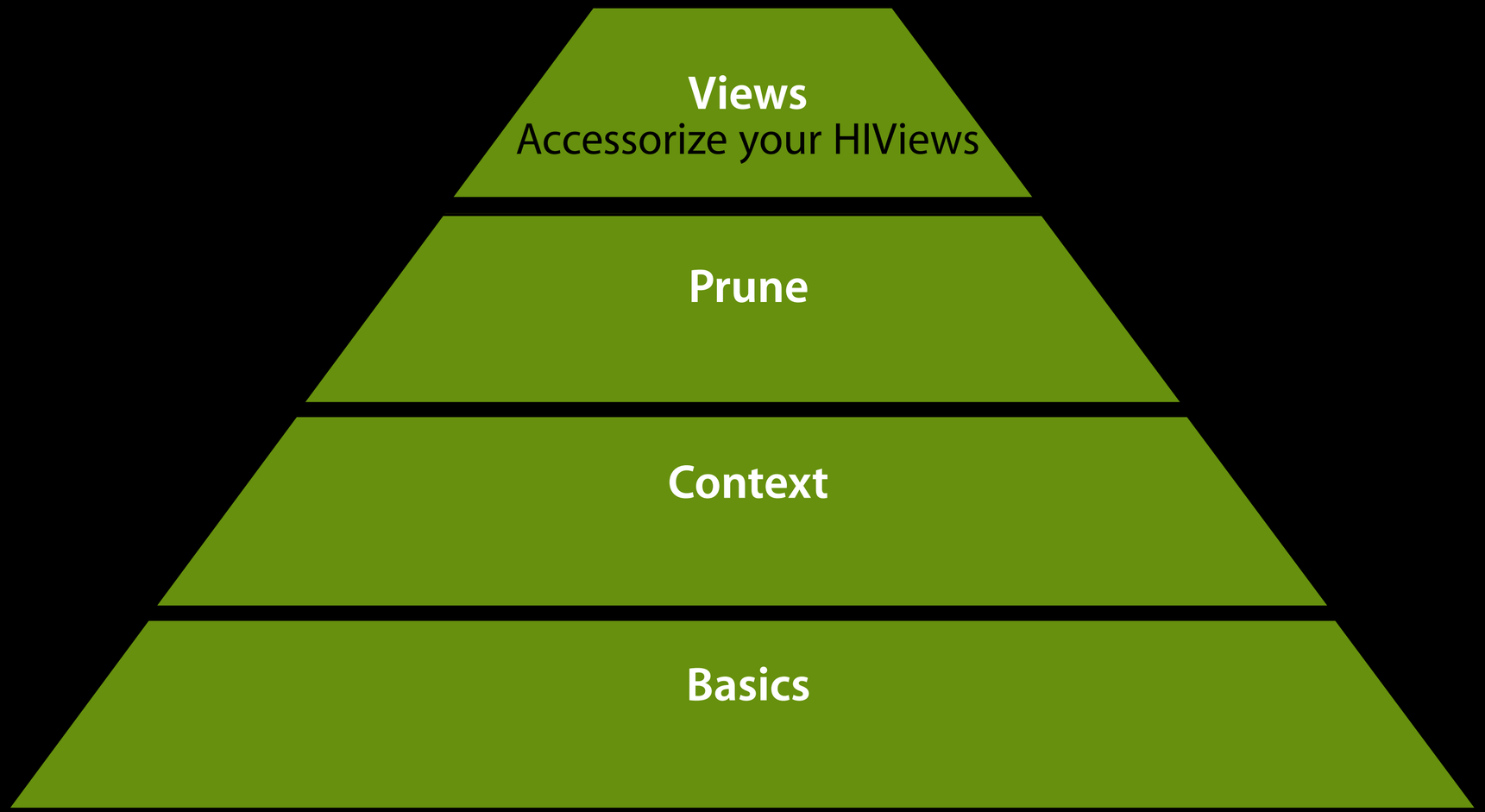
http://developer.apple.com/wwdc2005/


Context
AXDescriptions, AXTitleUIElements, etc.
Basics

Prune Unnecessary Elements



Accessorize Custom Views



Accessorize Custom Views

- HIView provides lots already
  - AXParent, AXWindow, AXSize, etc.
- You provide some Attributes
  - AXRole, AXValue, etc.
- You provide relevant Actions
- You provide Notifications as necessary

Demo

Accessorizing a Custom View

http://developer.apple.com/wwdc2005/

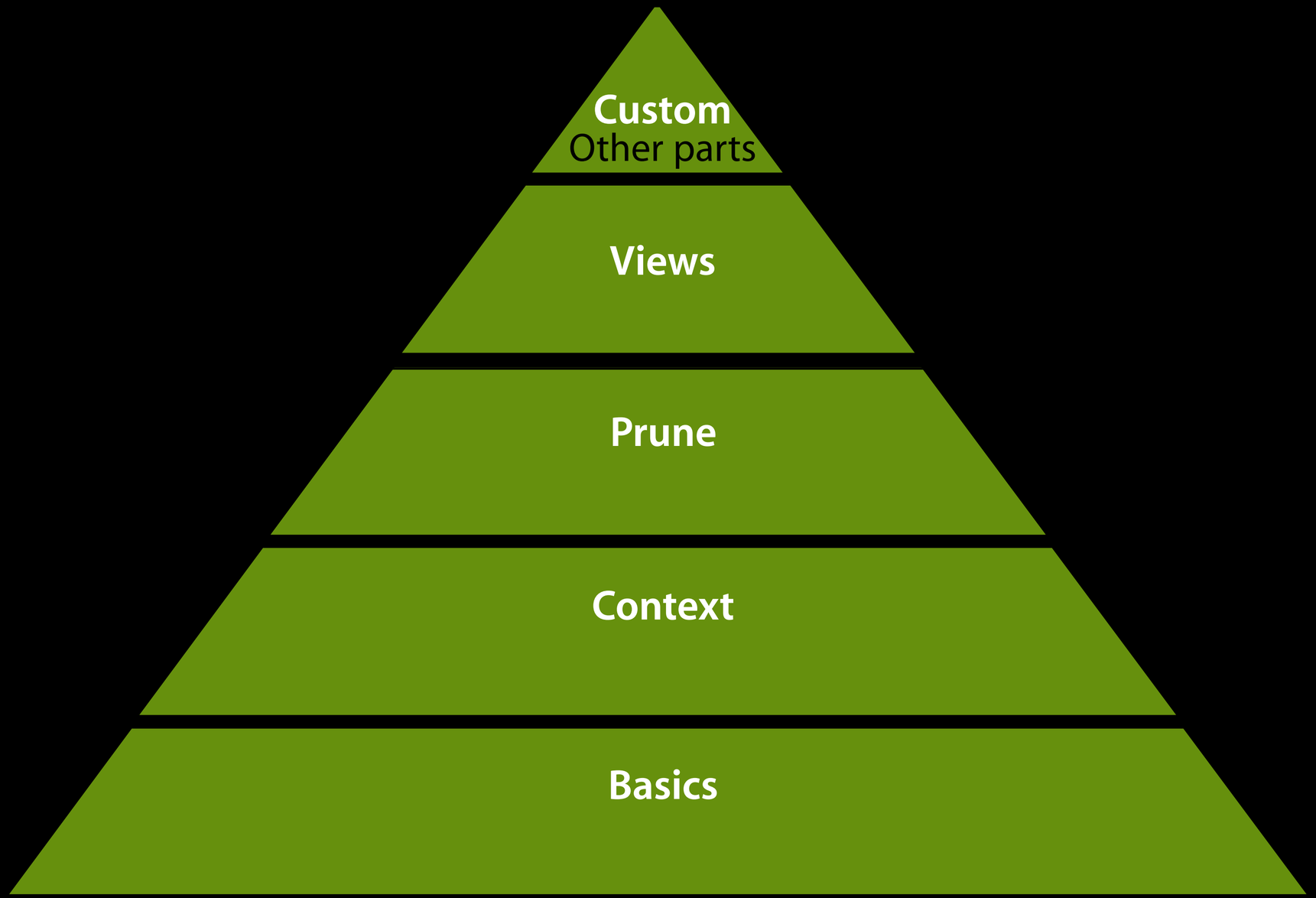
Views
Accessorize your HIViews

Prune

Context

Basics

Accessorize Custom Interface



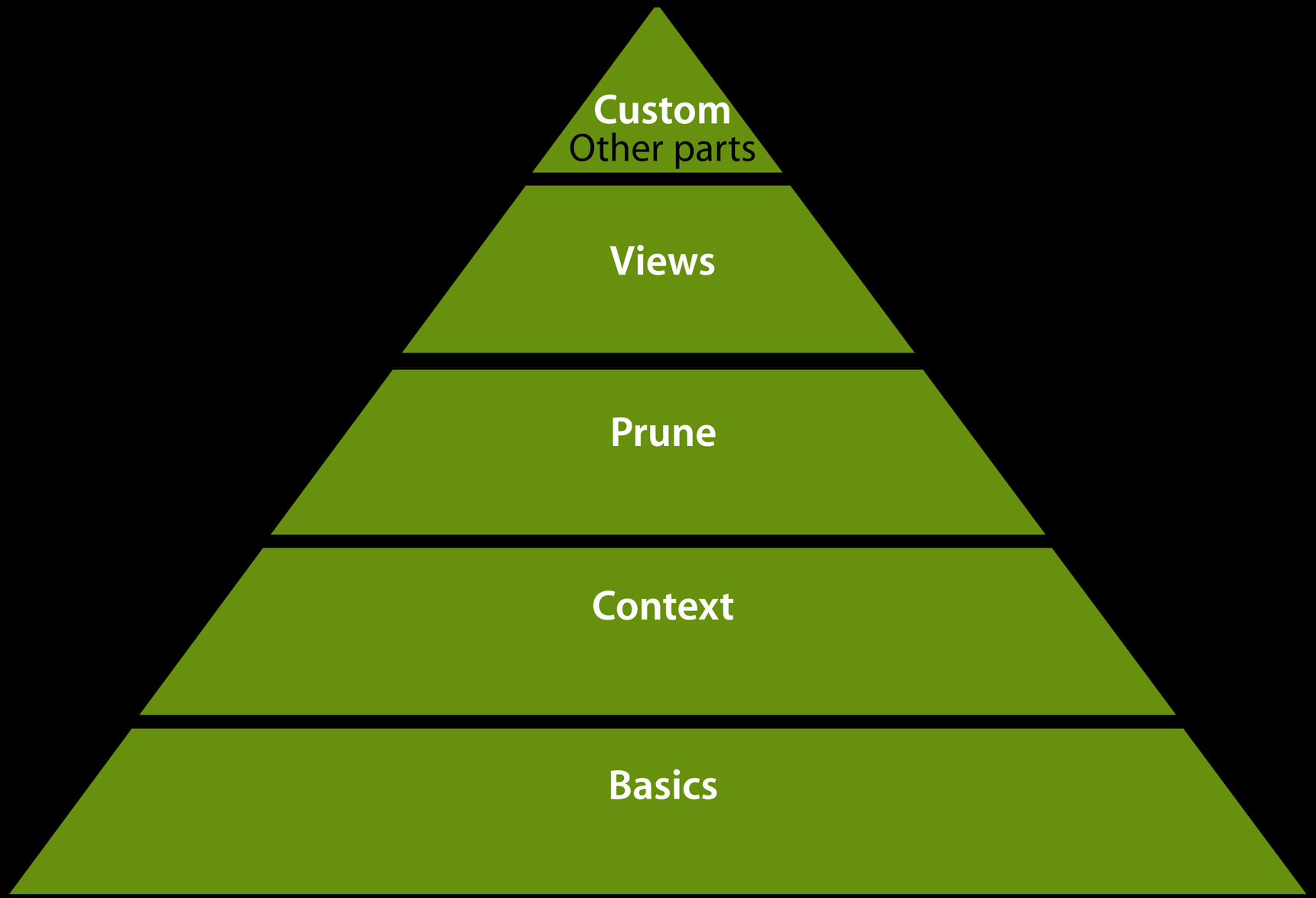
Accessorize Custom Interface

- Provide Attributes
- Provide Actions
- Insert into the containment hierarchy
  - Parent must provide Child at point and Child at focus
  - Parent must report appropriate AXChildren
  - Child must report appropriate AXParent
- Provide Notifications

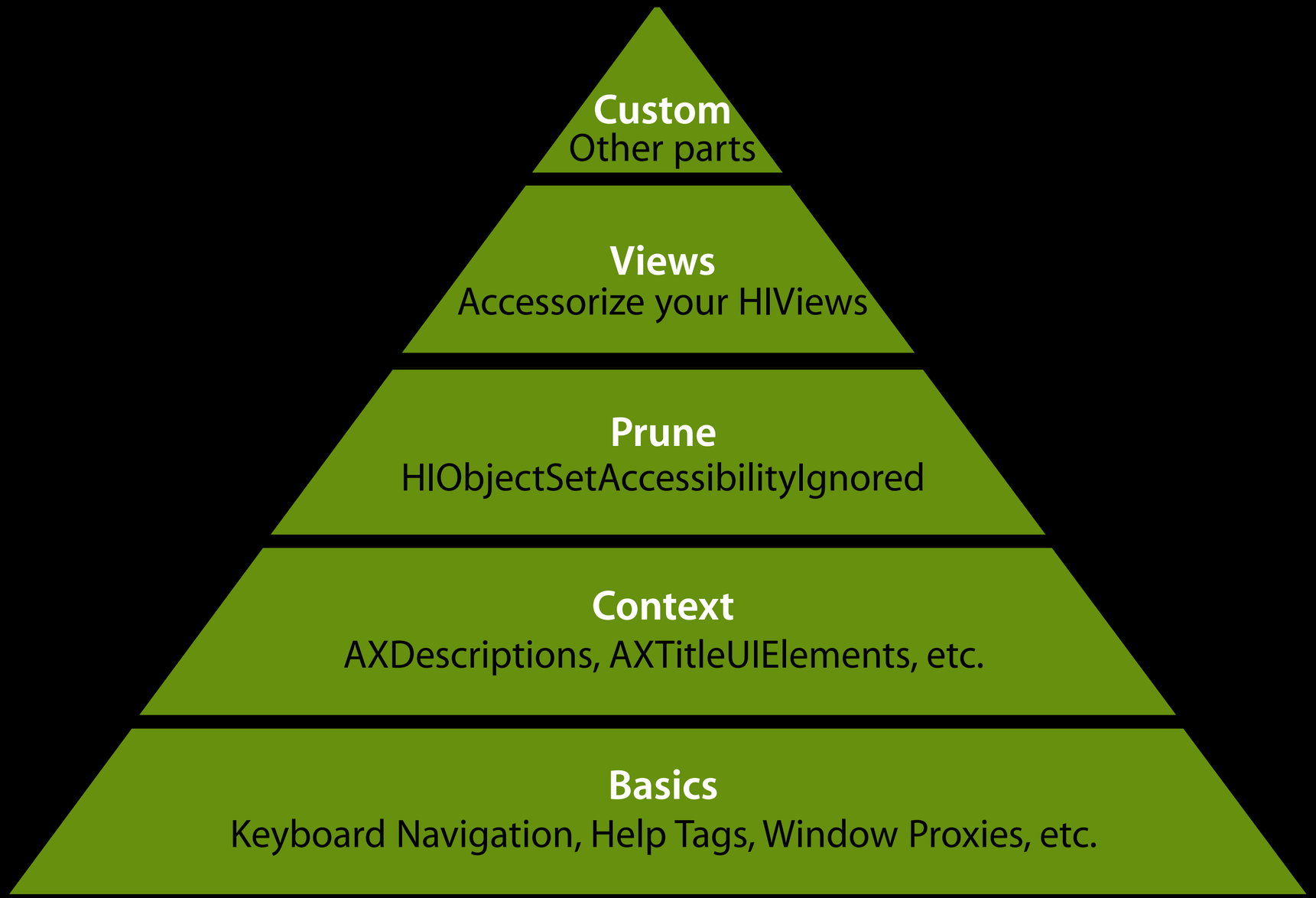
Demo

Accessorizing a Custom Interface

http://developer.apple.com/wwdc2005/


Custom
Other parts
Views
Prune
Context
Basics

Full Accessibility Power



What You Can Do Now

- Add Accessibility support to your custom views, CDEFs, etc.
- Consider adopting HIView
- Leverage HIFramework
  - C++ wrappers around HIObject and HIView
  - Supports Accessibility methods

Demo

VoiceOver and ImageMapView

http://developer.apple.com/wwdc2005/

Roadmap

Building a Custom HIView	Session 116 Wednesday 10:30
Accessibility and VoiceOverFeedback Forum	Session 127 Thursday 9:00AM
Accessibility Lab	Friday 2:00PM

Who to Contact

Mary Beth Janes
Sr. Segment Manager
mjanes@apple.com

Accessibility-Dev Mailing List
accessibility-dev@lists.apple.com

Documentation, Sample Code, and Other Resources

http://developer.apple.com/wwdc2005/

Q&A

http://developer.apple.com/wwdc2005/

WWDC2005

Worldwide Developers Conference